Statement of Work

Title: Economic Valuation Tools for Conducting Benefits Analysis

Contract No.: EP-W-08-019

Work Assignment No.: 4-2

Estimated Level of Effort: 735

Period of Performance: March 13, 2012 – March 10, 2013

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Background

Work Assignment No. 3-3, performed under Contract No. EP-W-08-019, began work to advance the U.S. EPA's ability to estimate the economic value ("benefits") of administrative actions resulting in improved water quality and other ecosystem services, including reduced morbidity risks. The approach involves (1) using the existing literature as a source of information on methodology and data for benefit transfer, and (2) developing a methodology for automating the use of value functions from specific water quality valuation studies to estimate the benefits of changes in water quality data and model output.

The purpose of this work assignment is to build upon the previous work assignment's efforts in this area. Additional background information is provided with the description of each task.

TASKS

Task 1: Administrative Requirements

A. Work Plan & Cost Estimate – the contractor shall develop a Work Plan and cost estimate in accordance with the terms and conditions of the contract.

B. Quality Assurance Project Plan (QAPP) – the contractor shall develop a QAPP in accordance with the terms and conditions of the contract

Deliverables:

i. Work Plan and Cost Estimate – 20 days after issuance of work assignment
ii. QAPP due within 5 business days of workplan approval.
iii. Revised QAPP within 5 business days of receiving written feedback from the WAM.

Task 2: Research Assistance

The contractor shall support the WAM with research assistance on the following tasks pertaining to the estimation of the benefits of EPA administrative actions. This task will build off of Work Assignment No. 3-3, Task No. 2. Memo numbering will follow the previous work assignment. The reviews shall be technically rigorous, and meet EPA reporting, peer review, quality assurance, and documentation requirements. Deadlines and content on the following deliverables will be clarified by technical direction.

A. Meta-Analysis and Benefit Transfer Methodology: The contractor shall review recent literature on meta-analysis and benefit transfer methodology and write a memorandum summarizing the findings. The purpose of this task is to identify new insights from the literature since the following papers were written by the contractor and the WAM under contract No. 68-C-01-142 ("Economics and Benefits Analyses and Economics Research Support", 2001-2006):

- "A Primer on the Estimation of Economic Values Using Meta-Analysis"
- "Issues with Sample Selection When Estimating Economic Values Using Meta-Analysis"
- "Imposing Structure on the Estimation of Economic Values Using Meta-Analysis"

Deliverables:

i. Memo No. 3 (*Meta-Analysis & Benefit Transfer Methodology*; ≤ 20 pages) and electronic (pdf) copies of reviewed documents (due date by technical direction).
ii. Revisions (initial and on-going) to Memo No. 3 within 10 business days of receiving feedback from the WAM.

B. Value of Sampling (Monitoring) Data: The contractor shall review the literature on the statistical and economic value of sampling (monitoring) data and formulate a conceptual model describing how sampling (monitoring) adds statistical power and reduces uncertainty in predictions (forecasts) of environmental outcomes and their benefits (economic values) to humans. The review and analysis shall be written in a memorandum format, and at minimum, account for private and public (collective) values for data, and spatial, temporal and other dimensions of scale and scope affecting statistical representation. The purpose of this task is to gain technical insights on the benefits of sampling (monitoring) and how strategic choices can increase the return on investment in data collection.

Deliverables:

iii. Revisions (initial and on-going) to the Memo No. 4 draft (*Value of Sampling (Monitoring) Data*) developed under Work Assignment No. 3-3 within 10 business days of receiving feedback from the WAM.

Task 3: Methodology for Automating the Use of Water Quality Value Functions from Selected Studies

The contractor shall support the WAM in developing a technical document describing a methodology for automating the use of water quality value functions from selected studies. This task will build off of Work Assignment No. 3-3. Memo numbering will follow that work assignment. The report shall be technically rigorous, and meet EPA reporting, peer review, quality assurance and documentation requirements. It shall also provide a complete description of development requirements allowing an IT system developer to implement and host the system with minimal, if any, additional requirements analysis. It is anticipated that an efficient IT system will (1) leverage a common socioeconomic and geospatial data structure to efficiently utilize a large number of value functions, (2) display and highlight key similarities and differences in methodologies and assumptions underlying the different value functions, and (3) display the results of the different approaches for comparison.

The approach taken to writing this technical document shall involve preparing a written analysis of alternative approaches to automating the application of water quality value functions from selected studies. The approach shall include reviewing published water quality valuation studies and selecting 3-6 studies for in-depth analysis. The list of studies under consideration shall include, but not be limited to:

- Huber and Viscusi (2006) and Viscusi, Huber and Bell (2008);
- Carson and Mitchell (1993);
- Van Houtven, Powers and Pattanayak (2006); and
- The meta-analysis conducted for EPA's 2009 Construction and Development Effluent Limitation Guideline.

The contractor shall support the WAM by identifying alternative approaches to automating the application of specific value functions from these studies, conducting an analysis of these alternatives, and supporting the WAM in developing a preferred approach to implementation. The report will be submitted for independent peer review, then revised and finalized prior to systems development.

Specific contractor tasks include the following:

A. <u>Value Function Selection and Requirements Analysis of Selected Value Functions</u>: The contractor shall continue to develop and describe alternative approaches to automating the application of value functions from the selected studies. As mentioned above, this task will build off of Work Assignment No. 3-3, Task No. 3. The contractor shall submit a memo (Memo No. 8) incorporating revisions to the tasks detailed under Memo Nos. 6 and 7 in Work Assignment No. 3-3 (Task No. 3). Memo No. 6 involved describing value functions from the selected studies and options for implementation, as well as value function selection criteria, a proposed list of value functions for further analysis and the rationale for including or excluding each value function option developed. The contractor was to highlight general scientific, statistical and IT issues (e.g., data management, processing, hosting, security) that may affect the selection of value functions for implementation. Memo No. 7 involved conducting an in-depth requirements analysis of alternative approaches to automating selected value functions. The contractor was to show the results of the alternatives analysis, as well as highlight important pros, cons and trade-offs affecting the scientific, statistical and IT issues described in Memo No. 6.

   <u>Deliverables</u>:

i. Memo No. 8 (*Description of Alternatives and Alternative Analysis*) and electronic (pdf) copies of reviewed documents due by technical direction.
ii. Revisions (initial and on-going) to Memo No. 8 within 10 business days of receiving feedback from the WAM.

B. Presentation Support and Meeting at EPA: The contractor shall support the WAM in preparing and revising slides describing Memos Nos. 5-7 (Memo No. 5 from Work Assignment No. 3-3) for presentation at EPA headquarters in Washington, DC. The contractor shall participate in the meeting, document the discussion and highlight key issues and next steps in a memo (Memo No. 8).

Deliverables:
i. Draft slides (*Presentation of Memos Nos. 5-7*; ≤ 40 slides in total) due by technical direction.
ii. Revisions to slides within 5 business days of receiving feedback from the WAM.
iii. Participation in presentation at EPA – date to be determined by technical direction.
iv. Memo No. 8 (*Meeting Notes*; ≤ 10 pages) due within 5 business days of the EPA meeting.
v. Revisions (initial and on-going) to Memo No. 8 within 5 business days of receiving feedback from the WAM.

C. Draft Report for Peer Review: The contractor shall write a draft report synthesizing Memos Nos. 5-8 based on written technical direction from the WAM. The report shall present a recommended approach to implementing a selected set of value functions and provide a clear rationale for this selection. The report quality must be sufficient for internal and external peer review.

Deliverables:
i. Draft Report for Peer Review (≤ 50 pages) due by technical direction.
ii. Revisions to Report within 5 business days of receiving written feedback from the WAM.

Note: The contractor is not responsible for conducting the peer review – this will be managed by the WAM independently.)

D. Final Report: The contractor shall review peer reviewer comments (provided to the contractor by the WAM), develop written responses, perform additional analysis and make edits to the report based on written technical direction from the WAM. The contractor shall also perform a final IT requirements analysis of the selected approach, and write a final report.

Deliverables:
i. Draft written responses to peer reviewers due within 10 business days of receiving peer reviewer comments from the WAM.
ii. Revised draft report due within 10 business days of receiving technical direction from the WAM.
iii. Additional revisions due within 5 business days of receiving written feedback from the WAM.
iv. Final Report (≤ 50 pages) due by technical direction.

Task 3 References

Documents from EPA Contract 68-C-01-142, Work Assignment Nos. 2-16 & 3-16

Documents from EPA Contract EP-W-08-019, Work Assignment No. 3-3

Huber, Joel and W. Kip Viscusi (2006) "Economics of Environmental Improvement" Final Report

Viscusi, Huber, and Bell (2008) "The Economic Value of Water Quality" Environmental and Resource Economics 41(2): 169-187.

Carson, Richard T., and Robert C. Mitchell. 1993. "The Value of Clean Water: The Public's Willingness to Pay for Boatable, Fishable, and Swimmable Quality Water." Water Resources Research 29(7):2445-2454.

Task 4: NESCS

The contractor shall provide technical support in developing a report proposing a methodology for designing a national ecosystem services classification system. Specific deliverables include a draft report outline and draft chapters, as determined through technical direction.

Task 5: HAWQS

The contractor shall use the HAWQS model to conduct baseline and counterfactual ("policy") scenarios corresponding to the water quality modeling portion of an analysis of the benefits of a given policy option. The contractor shall also prepare for a 1-day workshop at EPA headquarters to discuss the results of this analysis. Specific deliverables will be determined through technical direction.

Task 6: Ozone

Subtask 6.1: Ozone effects on ecosystem services

The Contractor shall use FASOM to generate estimates of ozone effects on ecosystem services. To complete this WA, the Contractor shall work with EPA (OAQPS, ORD) staff to obtain the most current concentration-response data for affected species and required air quality modeling data.

The final report shall document the data inputs, methods, results, and known limitations and uncertainties. The report will also include a database or spreadsheet with the detailed model outputs.

Subtask 6.2: GIS Mapping

The Contractor shall provide GIS mapping in support of the Ozone Secondary NAAQS review. EPA will provide map templates and procedures.

Task 7: NOxSOx Soil Weathering - Complete soil mineralogy layer and estimate base-cation weathering (BCw) rates

The Contractor shall expand the soil mineralogy and BCw rates data layers from the pilot sites to a complete coverage for Pennsylvania. The Contractor shall focus on the following specific subtasks applied to soils in Pennsylvania:

7.1: Gather and review available mineralogy datasets.

7.2: Review methods that have been used to extrapolate soil mineralogy data points.

7.3: Build soil mineralogy data points.

7.4: Group surficial and bedrock geology into common parent materials based on BCw potential (rate and composition).

7.5: Produce a continuous map of soil mineralogy for PA based on the new, enhanced dataset of soil mineralogy and the "common parent material" method for extrapolation.

7.6: Estimate BCw rates for PA using the new mineralogy datalayer (i.e., rerun the PROFILE model using the new BCw data).

The Contractor shall prepare and submit a journal article detailing the findings of this effort. The journal will be selected by the WAM. The Contractor shall also present the results at the annual meeting of the National Atmospheric Deposition Program. The Contractor shall also prepare a draft final report for review by the WAM, followed by a final report fully describing the work completed under this work assignment and the lessons learned.

The Contractor shall include a quality assurance section in the final report discussing the data used with respect to precision, accuracy, representativeness, comparability, completeness, sensitivity, and appropriateness as it applies to this use and its source. The QA section shall discuss how the Contractor ensured that the soils data were of acceptable quality and that they were being used for the purpose for which they were collected.

Deliverables:

i. Draft Final Report due by technical direction

ii. Draft Journal Article due by technical direction

iii. Final Report due by technical direction

iv. Final Journal Article ready for submission due by technical direction

SUMMARY OF WRITTEN DELIVERABLES

Deliverables	Due Date
Task 1- Administrative	
Workplan	In accordance with the terms of the contract
QAPP	Within 5 business days of workplan approval
Task 2- Research Assistance	
Memo 3 (*Meta-Analysis & Benefit Transfer Methodology*)	By technical direction
Memo 4 (*Value of Sampling (Monitoring) Data*)	By technical direction
Task 3- WQ Value Function Methodology	
Draft Report for Internal Review	By technical direction
Draft written responses to reviewer comments	Within 10 business days of receiving reviewer comments from the WAM
Revised Draft Report	Within 10 business days of receiving technical direction from the WAM
Draft slides on Memos 5-7	By technical direction
Participation in presentation at EPA meeting	By technical direction
Memo 8 (*Meeting Notes*)	Within 5 business days of EPA meeting
Task 4- NESCS	
Draft Report Outline	By technical direction
Initial Draft Chapters	By technical direction
Task 5- HAWQS	
Deliverables by technical direction	
Task 6- Ozone	
Report	By technical direction
GIS Mapping	By technical direction
Task 7- NOxSOx Soil Weathering	
Draft Final Report	By technical direction
Draft Journal Article	By technical direction
Final Report	By technical direction
Final Journal Article ready for submission	By technical direction